Journal of Pioneering Medical Sciences
Received: May 30, 2025 | Accepted: August 09, 2025 | Published: October 05, 2025
Volume 14, Issue 09, Pages 68-78

DOI https://doi.org/10.47310/jpms2025140909

Public Knowledge, Attitude, and Practice toward Eye Emergencies and Injury First Aid in Saudi Arabia

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Abstract: Background: Ocular trauma, including corneal epithelial defects (CED) and chemical burns, are common and can lead to severe complications if untreated. Chalazion, conjunctivitis, and contact lens misuse also pose risks. Severe conditions like retinal detachment, glaucoma, and uveitis require early detection. Public awareness is vital for prevention and effective management. Aim/Objective To assess Knowledge, Attitude, and Practice Towards Eye Injury First Aid Among the General Population in Saudi Arabia. **Aim and Objective:** To assess Knowledge, Attitude, and Practice Towards Eye Injury First Aid Among the General Population in Saudi Arabia. **Methods:** It is a retrospective cohort study targeting the general population of Saudi Arabia. An online questionnaire in Arabic and English was randomly distributed to gather diverse samples. Data was cleaned in Excel and analyzed in IBM SPPS 29. **Results:** Our study comprised 196 participants aged 16 to 70 years (mean: 34.4±12.8). Female participants were 116 (59.2%), and 190 (96.9%) were Saudi. Among participants, 109 (55.6%) were single, and 143 (73%) had a university degree. A monthly income of less than 5000 SR was reported by 24 (12.2%), while 50 (42.3%) earned between 10000-20000 SR. Knowledge about eye conditions varied, with 33.2% correctly defining glaucoma and 54.1% defining uveitis. 74.5% knew the definition of corneal abrasion, and 65.8% identified foreign body sensation as a symptom. None of the demographic factors significantly affected overall knowledge ($p > 0.05$). The highest knowledge score percentage was for retinal detachment (2.9±1.3; 73.7%), and the lowest was for ocular chemical burn (2.5±1.1; 49.7%). 101 (51.5%) had good knowledge, while 95 (48.5%) had poor knowledge. There is no significant association between knowledge level and different factors. **Conclusion:** Our study revealed moderate overall knowledge about eye conditions. There is a high awareness of retinal detachment and a low awareness of ocular chemical burns. Despite diverse demographics, no factors significantly impacted overall knowledge. Approximately half of the participants demonstrated exemplary knowledge, highlighting the need for improved public education on eye health.

Key Words: First Aid, Knowledge, Attitude, Retinal Detachment, Abrasion, Ocular Injuries

INTRODUCTION

Ocular trauma continues to be the primary cause of avoidable monocular or bilateral blindness around the world despite significant improvements in both the avoidance and management of trauma to the eye [1]. Preventing eye injuries and severe risks or complications is a must, as well as knowledge, attitude, and practice towards eye injury first aid. In addition to injury avoidance techniques, eye injuries' characteristics must be recognizable. According to the

World Health Organization (WHO), around 55 million people have damage to the eyes worldwide every year, resulting in 750,000 admissions to hospitals, over 23 million people suffering from severe visual consequences, and nearly 55 million ocular injuries [2]. In the Kingdom of Saudi Arabia (KSA), a study was done in King Abdulaziz University Hospital (KAUH) in Riyadh, Kingdom of Saudi Arabia, in July 2010 to investigate the number and characteristics of patients coming to the Emergency room complaining of ocular emergency which reveals that more than 50% of those patients did not have an actual ocular emergency [3]. Moreover, in the United States (US), approximately 2.4 million annual US emergency department visits are related to ocular injuries [4].

Ocular emergencies such as corneal epithelial defects, chemical burns, chalazion, conjunctivitis, retinal detachment, glaucoma, and uveitis are common ocular emergencies encountered in Saudi Arabia. Previous epidemiological studies worldwide have identified the characteristics and mechanisms of injury associated with different eye emergencies. In KSA, trauma was the most common reason for ER visits (61%), followed by conjunctivitis (14.9%) [3]. This is similar to the US, where trauma was also the first reason for ocular emergency visits [4]. Corneal epithelial defect (CED) is defined as the loss of the superficial epithelial layer of the cornea and is considered a medical emergency. The majority of CED cases happen due to mechanical trauma [3]. However, the major cause of the young population is fingernail trauma [3]. These injuries can present with tearing, pain, photophobia, foreign body sensation, and a gritty feeling [4]. Locally, a retrospective study was conducted at King Abdulaziz University Hospital (KAUH) in Riyadh, Kingdom of Saudi Arabia, in July 2010, involving a total of 1,412 patients. The incidence of corneal abrasion was 277 (72.5%) [5].

Chemical burns are another form of eye injury; they happen when a chemical, power, or fluid comes in contact with the cornea or conjunctiva of the eye. Symptoms can vary from temporary tearing, blurred vision, to total visual loss or loss of the globe if there is no medical intervention [6]. Most chemical ocular burns are preventable by increasing the Saudi population's awareness of prompt water irrigation and first aid [7], considered secondary prevention. However, the primary prevention is encouraging employees in high-risk occupations to wear eye protection glasses (protective goggles) [8]. Chalazion is a benign inflammatory lesion of the sebaceous glands of the eyelids. The superficial chalazion is caused by inflammation of a Zeiss gland. However, deep chalazion is caused by inflammation of the tarsal meibomian gland [9]. A retrospective study used the medical records of patients attending the A/E at King Abdulaziz University Hospital (KAUH) in Riyadh, Saudi Arabia. 77.5% of the cases were self-referrals. Additionally, 50.4% were considered non-emergency, and patients visited for dry eye, allergy, blepharitis, and chalazion [5]. Conservative management is the initial management for chalazion, which mostly resolves within a month [10]. Contact lenses positioned on the eyes have beneficial purposes in correcting vision. CL has also become widely used for cosmetic purposes. In the United States, around 40.9 million adults wear CL, and 99% do at least one hygiene-related risky behavior [11]. A local study in Jeddah, 66% was the average compliance rate to CL care. In addition, low levels of participants reported washing their hands before CL use. Interestingly, researchers found that participants overuse CL because of believe there is no harm was the reason for overusing them [12]. Regarding conjunctivitis, it refers to any inflammatory condition of the membrane that lines the eyelids and covers the exposed surface of the sclera [13]. The prevalence and incidence of conjunctivitis are alternatively based on etiology. It is either infectious, like viral, bacterial, fungal, and parasitic, or non-infectious like allergic conjunctivitis [14]. A study in Aseer, Saudi Arabia, found that 51.2% of participants view eye inflammation as harmless and believe itching is the main allergy symptom. Furthermore, 58.7% do not believe it is contagious. These findings suggest low awareness among university students [15].

Retinal detachment refers to the separation of the retina from the underlying retinal pigment epithelium and choroid [16]. Having knowledge about the disease is essential in order to have positive outcomes and to save the sight of affected patients. According to a recent study conducted among 1076 adults in Poland, approximately 40% of the participants were aware of retinal detachment and had good outcome knowledge [17]. Glaucoma refers to a pathology of the optic nerve caused by degeneration of ganglion cells of the retina, which will lead to optic disc cupping and hence vision loss [18]. Worldwide, glaucoma affects around 70 million people [19]. In Saudi Arabia, there are different epidemiological data about glaucoma. A community-based survey targeting those aged 40 years and older who lived in Riyadh found that glaucoma affected more than 1/20 Saudis who were aged 40 years and older [20]. Regarding uveitis, an inflammation of the uveal part of ocular tissue, which contains the iris, ciliary body, and choroid [21]. Among the working-age population, uveitis is one of the major causes of legal blindness [22]. In Saudi Arabia, the largest study investigated the types of uveitis in a tertiary care center in the Riyadh region, found that among a total of 888 uveitis patients, 43,9% were men with a mean age of 39 years old. Uveitis was binocular in 63% of cases [23]. Uveitis is a sight-threatening condition; therefore, inadequate knowledge about the sequelae of untreated uveitis would delay the detection of uveitis before vision loss is clinically apparent.

Understanding the Saudi general population's knowledge, attitude, and practice regarding eye injuries would prevent secondary vision-threatening complications, improve outcomes, and avoid unnecessary emergency visits.

Objective of Study

- To assess knowledge of the general population in Saudi Arabia regarding eye injury first aid and common ocular conditions
- To evaluate public attitudes towards eye injury prevention and management
- To examine practices adopted by the population in response to eye injuries
- To determine associations between demographic factors and KAP levels
- To identify specific knowledge gaps that require public health education

METHODS

A descriptive cross-sectional web-based study was conducted to assess public knowledge and awareness about eye injuries in Saudi Arabia. A total of 196 eligible participants completed the study questionnaire. All persons aged 18 years or above who consented to participate in the study and live in Saudi Arabia were enrolled in the study's final analysis. Persons who declined to consent, were aged below 18 years, or spoke a language other than Arabic and outside Saudi Arabia were excluded from the study. An online questionnaire was developed by the study researchers after a literature review and consulting the field experts. Questionnaire validity, reliability, and clearness were evaluated by 3 expert staff independently with all changes done till achieving the used version of the study questionnaire. Reliability co-efficient bases on a pilot of 10 persons was assessed as 0.71. The anonymous questionnaire was published using the social media platforms from April, 2024 to June, 2024. Respondents were encouraged to participate in this study by clarifying the extent of confidentiality of participation and the importance of this research to society's health. The questionnaire of this study included participants' demographic data (Age, Gender, Residence, Education, Occupation, Monthly Household Income, Marital Status, eye injury history). The second part covered participants' knowledge and awareness about eye diseases and injuries, trauma, and first aids with single of multiple correct answers allowed. The final questionnaire was uploaded till no more new answers were obtained.

Inclusion and Exclusion Criteria

Residents of Saudi Arabia who were able to comprehend, read, and write Arabic or English were included in the study. Participants with incomplete answers to questions and who were outside Saudi Arabia were excluded from the study.

Persons who declined to consent, were aged below 18 years, or spoke a language other than Arabic and outside Saudi Arabia were excluded from the study.

Data analysis

The data were collected, reviewed, and then fed to Statistical Package for Social Sciences version 21 (SPSS: An IBM Company). All statistical methods used were two-tailed with an alpha level of 0.05, considering significance if the P value is less than or equal to 0.05. Overall knowledge and awareness levels regarding eye diseases and injuries were assessed by summing up discrete scores for different correct knowledge items. The total knowledge score for each disease or injury was calculated, and the overall knowledge score was categorized as a poor level if the participant's score was less than 60% of the overall score, and a good level of knowledge was considered if the participant's score was 60% or more of the overall score. Descriptive analysis was done by prescribing frequency distribution and percentage for study variables, including participants' personal data and income. Also, knowledge regarding eye diseases and injuries was tabulated while overall knowledge was graphed. The mean and percentage scores of totals were calculated for each disease and injury. Cross tabulation for showing factors associated with study participants' knowledge of eye disease and injury was carried out with Pearson chi-square test for significance and exact probability test if there were small frequency distributions.

RESULTS

A total of 196 eligible participants completed the study questionnaire. Participants' ages ranged from 16 to 70 years, with a mean age of 34.4±12.8 years old. A total of 116 (59.2%) were female participants, and 190 (96.9%) were Saudi. 109 (55.6%) were single, 143 (73%) had university degrees, and 18 (9.2%) had postgraduate degrees. Monthly income less than 5000 SR was reported among 24 (12.2%), 5000-10000 SR among 39 (19.9%), 10000-20000 Sr among 50 (42.3%), and 83 (21.4%) had more income (Table 1).

Table 1: Personal Characteristics of Study Participants, Saudi Arabia

Personal data	No	%
Age in years		
16-24	78	39.8%
25-34	42	21.4%
35-44	34	17.3%
45-54	31	15.8%
55-64	11	5.6%
Gender		
Male	80	40.8%
Female	116	59.2%
Nationality		
Saudi	190	96.9%
Non-Saudi	6	3.1%
Marital status		
Single	109	55.6%
Married	87	44.4%
Educational level		
Secondary / below	35	17.9%
University degree	143	73.0%
Post-graduate	18	9.2%
Monthly income		
< 5000 SR	24	12.2%
5000-10000 SR	39	19.9%
10000-20000 SR	50	25.5%
20000-40000 SR	42	21.4%
> 40000 SR	41	20.9%

Table 2: Participants' Knowledge and Awareness About Glaucoma and Uveitis

Eye diseases and injuries knowledge	No	%
Glaucoma		
What is glaucoma?		
Condition in which it damages the optic nerve and is usually associated with increased intraocular pressure.	65	33.2%
Condition in which the lens of the eye becomes cloudy	101	51.5%
Inflammation of the outer layer of the eyes	17	8.7%
Condition in which a thin layer of tissue (the retina) at the back of the eye pulls away from its normal position	13	6.6%
Symptoms of glaucoma		
Eye pain and redness	76	39.0%
Headache and vomiting	49	25.1%
Loss of vision	149	76.4%
Itchiness	47	24.1%
Eye dryness	67	34.4%
What is the 1st thing you will do if you think you have glaucoma?		
Go immediately to the emergency department	153	78.5%
Use of over counter lubricants eye drops	27	13.8%
Wash your eye with lukewarm water	9	4.6%
Cover your eye with patch	6	3.1%
Which of the following is the best practice that should be taken by a glaucoma patient?		
Regular follow up with an ophthalmologist	167	85.2%
Use alternative medicine methods such as Cautery/ honey	11	5.6%
Regular use of anti-inflammatory eye drops	18	9.2%
Uveitis		
What is uveitis?		
Inflammation of the middle layer of the eyes	106	54.1%
Condition in which a thin layer of tissue (the retina) at the back of the eye pulls away from its normal position.	35	17.9%
Condition in which it damages the optic nerve and is usually associated with increased intraocular pressure.	27	13.8%
Condition in which the lens of the eye becomes cloudy	28	14.3%
Symptoms of Uveitis		
Eye pain and redness	132	67.3%
Headache and vomiting	37	18.9%
Loss of vision	69	35.2%
Itchiness	99	50.5%
Eye dryness	78	39.8%
What is the 1st thing you will do if you think you have Uveitis?		
Go immediately to the emergency department/ PHC.	138	70.8%
Use of over counter lubricants eye drops	26	13.3%
Wash your eye with lukewarm water	19	9.7%
Cover your eye with patch	12	6.2%
Which of the following is the best practice that should be taken by a Uveitis patient?		
Use of anti-inflammatory eye drops that have been prescribed by a doctor.	134	68.7%
Putting teabags on the eyes	11	5.6%
Not to do anything as it is a self-limited condition	15	7.7%
Regular use of lubricant eye drops	35	17.9%

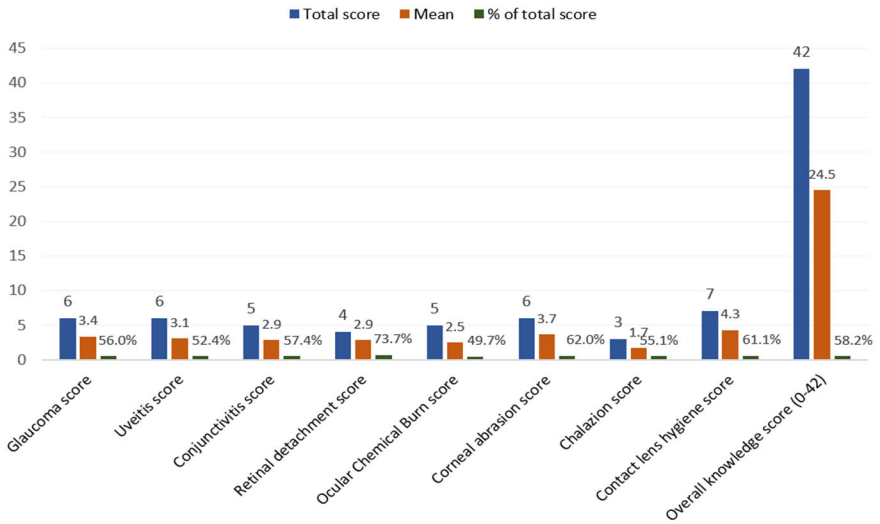

Figure 1: Participants' Knowledge Score for Different Eye Diseases, Injurie and Hygiene

Table 3: Participants' Knowledge and Awareness About Conjunctivitis and Retinal Detachment

Knowledge and awareness	No	%
Conjunctivitis		
What is Conjunctivitis?		
Inflammation of the outer layer of the eyes	90	46.2%
Condition in which a thin layer of tissue (the retina) at the back of the eye pulls away from its normal position	39	20.0%
Condition in which it damages the optic nerve and is usually associated with increased intraocular pressure	38	19.5%
Condition in which the lens of the eye becomes cloudy	28	14.4%
Symptoms of Conjunctivitis		
Eye Itchiness and discharges	115	58.7%
Eye pain and redness	92	46.9%
Double vision	75	38.3%
Headache and vomiting	32	16.3%
Loss of vision	44	22.4%
What is the 1st thing you will do if you think you have Conjunctivitis?		
Go to the ophthalmologist	140	71.8%
Cover your eye with patch	26	13.3%
Use of eye drops that have been prescribed by pharmacist	15	7.7%
Regular use of lubricant eye drops	14	7.2%
Which of the following is the best practice that should be taken by a Conjunctivitis patient?		
Use of anti-inflammatory eye drops that have been prescribed by a doctor.	126	64.3%
Putting teabags on the eyes	13	6.6%
Not to do anything as it is a self-limited condition	23	11.7%
Regular use of lubricant eye drops	34	17.3%
Retinal detachment		
What is Retinal detachment?		
Condition in which a thin layer of tissue (the retina) at the back of the eye pulls away from its normal position	128	65.3%
Inflammation of the outer layer of the eyes	25	12.8%
Condition in which it damages the optic nerve and is usually associated with increased intraocular pressure	24	12.2%
Condition in which the lens of the eye becomes cloudy	19	9.7%
Symptoms of Retinal detachment		
Visual field defects	143	73.0%
Eye Itchiness and discharges	48	24.5%
Eye pain and redness	51	26.0%
Headache and vomiting	35	17.9%
Blurred vision	95	48.5%
What is the 1st thing you will do if you think you have Retinal detachment?		
Go immediately to the emergency department	149	76.0%
Use of over counter lubricants eye drops	17	8.7%
Wash your eye with lukewarm water for 10 minutes	13	6.6%
Cover your eye with patch	17	8.7%
Which of the following is the best practice that should be taken by a Retinal detachment patient?		
Regular follow up with an ophthalmologist	158	80.6%
Putting teabags on the eyes	16	8.2%
Regular use of anti-inflammatory eye drops	13	6.6%
Not to do anything as retinal detachment is a self-limited condition	9	4.6%

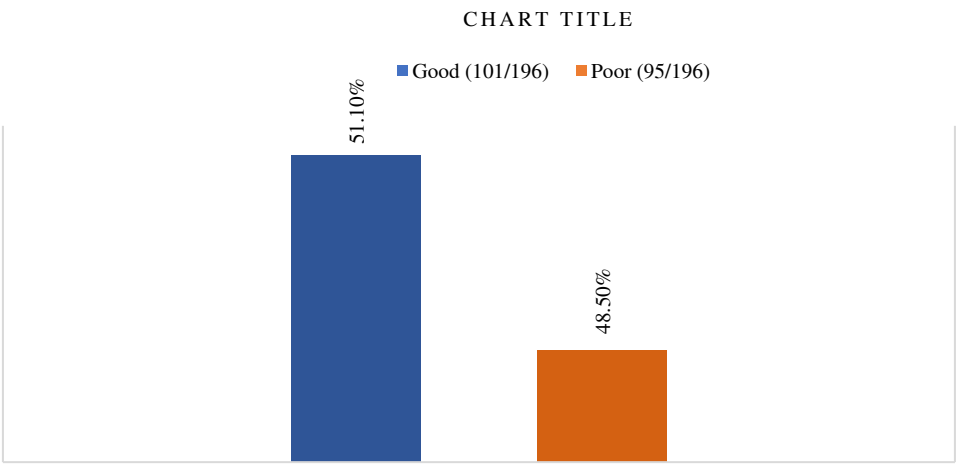

Figure 2: Overall Participants' Knowledge and Awareness About Eye Diseases, Injuries and Hygiene

Table 4: Participants' Knowledge and Awareness About Eye Diseases, Injuries and First Aid, Continued

Knowledge and awareness	No	%
Ocular Chemical Burn		
What is ocular chemical burn		
Eye exposure to chemical substance such as perfumes and detergents	163	83.2%
Eye Exposure to Fire flame	19	9.7%
Eye Exposure to sun rays	14	7.1%
Symptoms of ocular Chemical Burn		
Eye pain and redness	109	55.6%
Vision loss/ Blurred vision	88	44.9%
Eye dryness	59	30.1%
Seeing floaters like specks or lines	97	49.5%
Eye tearing	101	51.5%
What is the 1st thing you will do if you think you have Chemical Burn of your eyes?		
Wash your eyes with lukewarm water for at least 20 minutes	87	44.4%
Use of over-the-counter lubricants eye drops	14	7.1%
Cover your eyes with patches	13	6.6%
Do nothing and go to the emergency department/ PHC	82	41.8%
When eye injured with acidic material, wash with an alkaline solution and vice versa		
Disagree	40	20.4%
Agree	42	21.4%
Don't know	114	58.2%
Corneal abrasion		
What is corneal abrasion?		
Scrape or scratch injury of the cornea	146	74.5%
Inflammation of the outer layer of the eyes	25	12.8%
A condition in which a thin layer of tissue (the retina) at the back of the eye pulls away from its normal position	13	6.6%
A condition in which the lens of the eye becomes cloudy	12	6.1%
Symptoms of corneal abrasion		
Foreign body sensation in the eye	129	65.8%
Blurred vision	74	37.8%
Eye pain and redness	104	53.1%
Watery Eye	100	51.0%
Seeing floaters like specks or lines	59	30.1%
Getting annoyed from light	88	44.9%
What is the 1st thing you will do if you think you have corneal abrasion?		
Go immediately to the emergency department	126	64.3%
Use of over counter lubricants eye drops	20	10.2%
Wash your eye with water	12	6.1%
Cover your eye with patch	23	11.7%
Use Eye drops that have been prescribed by pharmacist	12	6.1%
Rubbing or excessively touching your eyes	3	1.5%
Which of the following is the best practice that should be taken by a corneal abrasion patient?		
Visit ophthalmologist and follow the instructions	150	76.5%
Use alternative medicine methods such as Cautery/ herbs (like tea bags)	13	6.6%
Regular washing of the eyes	14	7.1%
Not to do anything as Corneal abrasion is a self-limited condition	19	9.7%

Table 5: Participants' Knowledge and Awareness About Eye Diseases, Injuries and First Aid, Continued

Chalazion	No	%
What is Chalazion?		
Painful bumps on the eyelids with redness and swelling	107	54.6%
Inflammation of the outer layer of the eyes	25	12.8%
inflammation of the edges of the eyelids.	45	23.0%
Condition in which the lens of the eye becomes cloudy.	19	9.7%
Symptom of Chalazion		
Red, swollen, painful bump on the eyelids	133	67.9%
Seeing floaters like specks or lines	37	18.9%
Foreign body sensation inside the eyes	99	50.5%
Blurred vision	34	17.3%
What is the 1st thing you will do if you think you have Chalazion?		
Go immediately to the emergency department	84	42.9%
Use warm compresses over the eyelid	51	26.0%
Try to pop chalazion by pressing or squeezing it	7	3.6%
Wash your eyelid with water	17	8.7%
Gently massage the eyelid a few times a day	37	18.9%

Table 6: Participants Knowledge and Awareness About Contact Lens Hygiene

Contact lens hygiene	No	%
Do you think it is important to wash your hands before handling your contact lenses?		
Yes	169	86.2%
No	11	5.6%
Dont know	16	8.2%
After washing your hands Do you think it is important to dry them before handling your contact lenses?		
Yes	137	69.9%
No	25	12.8%
Dont know	34	17.3%
Do you think it's ok to wash the contact lenses with tap water?		
Yes	24	12.2%
No	141	71.9%
Dont know	31	15.8%
It is ok to wear weekly lenses for a week without taking them out?		
Yes	20	10.2%
No	132	67.3%
Dont know	44	22.4%
It is ok to use refreshing eye drops while wearing the lenses?		
Yes	81	41.3%
No	49	25.0%
Dont know	66	33.7%
What to do when feeling pain or itchiness while wearing contact lenses?		
Take them off immediately and visit an ophthalmologist when symptoms persist	144	73.5%
Use refreshing eye drops while wearing them	34	17.3%
Wash eyes with tap water	9	4.6%
Lick to moisturize the lenses	9	4.6%

Table 7: Factors Associated with Participants' Knowledge and Awareness About Eye Diseases, Injuries, and Hygiene

	Overall knowledge level				
	Poor		Good		
Factors	No	%	No	%	p-value
Age in years					0.924
16-24	36	46.2%	42	53.8%	
25-34	23	54.8%	19	45.2%	
35-44	16	47.1%	18	52.9%	
45-54	15	48.4%	16	51.6%	
55-64	5	45.5%	6	54.5%	
Gender					0.948
Male	39	48.8%	41	51.3%	
Female	56	48.3%	60	51.7%	
Nationality					0.939^
Saudi	92	48.4%	98	51.6%	
Non-Saudi	3	50.0%	3	50.0%	
Marital status					0.737
Single	54	49.5%	55	50.5%	
Married	41	47.1%	46	52.9%	
Educational level					0.990
Secondary / below	17	48.6%	18	51.4%	
University degree	69	48.3%	74	51.7%	
Post-graduate	9	50.0%	9	50.0%	
Monthly income					0.109
< 5000 SR	15	62.5%	9	37.5%	
5000-10000 SR	22	56.4%	17	43.6%	
10000-20000 SR	22	44.0%	28	56.0%	
20000-40000 SR	14	33.3%	28	66.7%	
> 40000 SR	22	53.7%	19	46.3%	

Table 2 participants' knowledge and awareness about eye diseases, injuries, and first aid. As for glaucoma, 33.2% correctly defined glaucoma, 76.4% reported loss of vision as a symptom, followed by Eye pain and redness (39%), and Headache and vomiting (25.1%). Regarding the first thing you will do if you think you have glaucoma, 78.5% know about going immediately to the emergency department, and 85.2% know that Regular follow-up with an ophthalmologist is the best practice a glaucoma patient should take. Considering uveitis, 54.1% correctly defined uveitis, 67.3% correctly reported Eye pain and redness as a symptom, and 35.2% for loss of vision, but 18.9% knew about Headache and vomiting. Approximately 70.8% know that they should go immediately to the emergency department/ PHC

when they have uveitis, and 68.7% said that using anti-inflammatory eye drops that have been prescribed by a doctor is the best practice.

Table 2. Participants' knowledge and awareness about eye diseases, injuries, and first aid. As for glaucoma, 33.2% correctly defined glaucoma, 76.4% reported loss of vision as a symptom. Uveitis, 54.1% correctly defined uveitis, 67.3% correctly reported Eye pain and redness as a symptom, and 35.2% for loss of vision.

With regard to conjunctivitis, 46.2% correctly defined the disease, 58.7% know about Eye Itchiness and discharges as a symptom A total of 71.8% know about going to the ophthalmologist the first thing. Regarding Retinal detachment, 65.3% correctly definedthe condition, and 73% know that Visual field defects are the main symptom (Table 3).

Knowledge and awareness about chemical burns and corneal abrasions. As for Ocular Chemical burns, 83.2% correctly characterized the case. Regarding Corneal abrasion, 74.5% correctly defined the condition, 65.8% reported Foreign body sensation in the eye, 53.1% reported Eye pain and redness, and 37.8% reported Blurred vision as the main symptoms (Table 4).

As for Chalazion Table 5, 54.6% correctly defined the condition, 67.9% correctly said that it is featured by red, swollen, painful bumps on the eyelids, and 42.9% know that they should go immediately to the emergency department.

A total of 86.2% think that it is important to wash your hands before handling your contact lenses. On the other hand, 71.9% did not think it was okay to washthe contact lenses with tap water, and 67.3% disagreed that it is okay to wear weekly lenses for a week without taking them out (Table 6).

None of the included demographic factors showed a significant association with their overall knowledge level (Table 7).

The highest knowledge score was for Retinal detachment (2.9±1.3; 73.7%), followed by Corneal abrasion (3.7±1.6; 62%), Contact lens hygiene (4.3±1.3; 61.1%), and Conjunctivitis (2.9±1.3; 57.4%), and Glaucoma (3.4±1.3; 56%). The lowest knowledge score was for Ocular Chemical burns (2.5±1.1; 49.7%). The overall knowledge score was 24.5±7.0 out of 42; 58.2% (Figure 1).

A total of 101 (51.5%) had an overall good knowledge and awareness of diseases, injuries, and hygiene, but 95 (48.5%) had a poor knowledge level (Figure 2).

DISCUSSION

Ocular trauma, including corneal epithelial defects (CED) and chemical burns, are prevalent eye injuries. Moshirfar *et al.* [24] show that the average rate of epithelial defects in SMILE is 3.3%, with a range of 0.17-17.5%. Akgun *et al.* [25] show that ocular chemical injuries account for 10.7%-34.7% of all chemical burn injuries. CEDs often result from mechanical trauma, especially fingernails, causing symptoms like tearing and photophobia, with long-term risks if untreated [26]. Chemical burns, influenced by pH levels, can cause severe complications if not promptly irrigated [27]. Chalazion, a benign eyelid lesion, commonly affects adults and requires conservative management. According to Stellwagen *et al.* [28], contact lenses, though beneficial, pose risks due to poor hygiene and cause abrasion and microbial keratitis. In particular, ocular allergies require appropriate treatment to avoid complications. Moreover, there are numerous conditions like retinal detachment, glaucoma, and uveitis, which are serious conditions that require early analysis and treatment to save you from vision loss. Increasing public awareness is critical for prevention and control. Our study assessed the knowledge, mindset, and practice toward eye accidents and first aid among the overall population in Saudi Arabia.

Our results show that knowledge and awareness levels differ significantly among various eye conditions. For glaucoma, a substantial portion of participants (33.2%) could correctly define the condition. This shows that a substantial number of participants are aware of the definition of glaucoma. Similarly, a study by Celebi *et al.* [29] shows that only 58.8% knew the definition of glaucoma. The awareness of symptoms like vision loss (76.4%) and eye pain (39%) was higher, and most participants (78.5%) knew to seek immediate medical attention. This indicates a relatively good awareness of glaucoma compared to other studies. However, a study by Tchiakpe *et al.* [30] shows that the majority of respondents could not define glaucoma (68.6%) and had no or inaccurate knowledge of the symptoms (80.7%).

Regarding uveitis, 54.1% of participants could define the condition, and a significant number recognized eye pain (67.3%) and vision loss (35.2%) as symptoms. These findings suggest moderate awareness, aligning with a study by Gaggiano *et al.* [31], which shows the knowledge of participants about uveitis as proficient in three cases (3.9%), adequate in 12 (15.6%), and sufficient in 13 (16.9%). However, a notable gap exists in recognizing secondary symptoms like headaches, which only 18.9% identified. Moreover, conjunctivitis awareness was relatively high, with 46.2% correctly defining the disease and 58.7% identifying itchiness and discharge as symptoms. Similarly, Silva *et al.* (2024) show that 74% have adequate knowledge regarding conjunctivitis [32]. Moreover, Arunachalam *et al.* [33] show that only 15.6% of people had an awareness of red eye (conjunctivitis), about 12.6% were aware of the serious side effects, and <10% were aware of the complication of permanent loss of vision if not treated. The high percentage of participants (71.8%) who know to consult an ophthalmologist indicates a good understanding of appropriate first-aid actions.

In regards the awareness and knowledge about retinal detachment, there is a higher recognition rate, with 65.3% correctly defining the condition and 73% identifying visual field defects as a primary symptom. This awareness is consistent with findings from a study by Kamińska *et al.* [16] in Poland, where 40% of participants were aware of retinal detachment and identified similar symptoms. The proactive

approach of 76% knowing to seek immediate emergency care further emphasizes the high level of awareness.

Chemical burns and corneal abrasions were less well understood. While 83.2% correctly characterized chemical burns, only 44.4% knew the appropriate first aid of washing the eyes with lukewarm water. This aligns with a study by Dhabaan *et al.* [34] in the Aseer region, Southern Saudi Arabia, which shows that public awareness regarding eye injury first aid in the Aseer region was poor, especially for chemical injuries. For corneal abrasions, 74.5% correctly defined the condition, but only 64.3% knew to seek emergency care, reflecting a need for better education on immediate first aid measures. Similarly, Alhothali *et al.* [35] show public awareness of eye injury and abrasion first aid was good. Chalazion awareness was moderate, with 54.6% correctly defining the condition. This suggests there is a moderate awareness about chalazion and a need for increased public health education on less common eye conditions [36].

Notably, our study revealed that most participants (86.2%) understood the importance of washing hands before handling contact lenses. However, a previous study by McMonnies *et al.* [37] shows poor awareness, with only 27% of wearers reporting an awareness that hand hygiene was an important factor in avoiding complications. However, fewer participants (69.9%) recognized the need to dry hands before handling lenses. There was a high awareness about the dangers of using tap water for cleaning lenses (71.9%). Similarly, Ibrahim *et al.* [38] show that 44.6% of participants believed that there is an increase in complications when rinsing lenses with tap water. Notably, the overall knowledge score was 58.2%, with 51.5% of participants displaying good knowledge. This is similar to the findings of a study by Kasaba *et al.* [39], which shows that most participants had adequate knowledge, with a score of 81.6%. None of the demographic factors showed a significant association with knowledge levels, suggesting that awareness campaigns should target the entire population rather than specific subgroups.

Comparing our findings with previous literature underscores the variability in public knowledge across different regions. While our study population shows moderate to high awareness of certain conditions, gaps consistent with global trends remain. Tailored educational interventions, leveraging both traditional and digital media, can bridge these gaps and improve overall eye health literacy.

CONCLUSIONS

Our study provides valuable insights on the current state of public knowledge, attitudes, and practices regarding eye injuries and first aid among the general population in Saudi Arabia. While the awareness was relatively strong in some areas, such as retinal detachment, notable gaps were evident in others, particularly chemical burns and corneal abrasions, where delays or incorrect responses can have devastating outcomes. These findings highlight the persistent need to strengthen eye health education through general awareness campaigns and practical first aid training in schools, workplaces, and the community. The knowledge gaps were consistent across all demographic groups, suggesting that the challenge is widespread and cannot be addressed by targeting a single population segment. Instead, a comprehensive, nationwide approach is required. By equipping individuals with the skills to recognize emergencies and respond appropriately, we can reduce unnecessary emergency visits, improve patient outcomes, and ultimately preserve vision on a broader scale. In conclusion, our study highlights the importance of continuous public health education to enhance awareness and promote effective first aid practices, ultimately improving eye health outcomes.

Disclosures

Human subjects: All authors have confirmed that this study did not involve human participants or tissue.

Animal subjects

All authors have confirmed that this study did not involve animal subjects or tissue.

Conflicts of interest

In compliance with the ICMJE uniform disclosure form, all authors declare the following

Payment and Services Info

All authors have declared that no financial support was received from any organization for the submitted work.

Financial Relationships

All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.

Other Relationships

All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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